Idaho National Laboratory

Spectrum Management Conference 2012 IMC

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Idaho National Laboratory

Demographics

Size

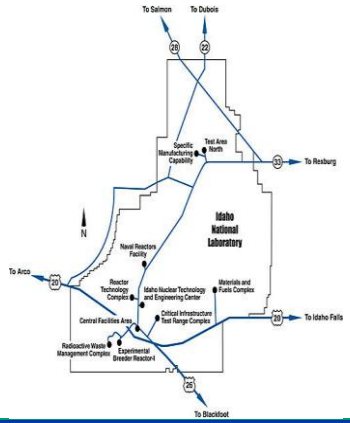
- 890 Square Miles
- 85% the size of Rhode Island

Location

- 45 Miles west of Idaho Falls
- Snake River Plain
- 10 Campus Locations

Environment

- Mountains with flat-to-gently-rolling high desert terrain
- 5000 feet elevation
- Located above one of the world's largest fresh water aquifer – estimated at 1 billion Acre Feet of Water
- Low population density, 1 person/sq mile



- **Missions: Nuclear Energy, National Security, Science**
- **INL: ~4200 employees**

INL - The National Nuclear Laboratory

Research – Development – Demonstration — Deployment

Our Business, Research Programs of National Importance and Regional Relevance.

Delivering technologies that benefit our communities, state, region, country and the world

Current Wireless Systems

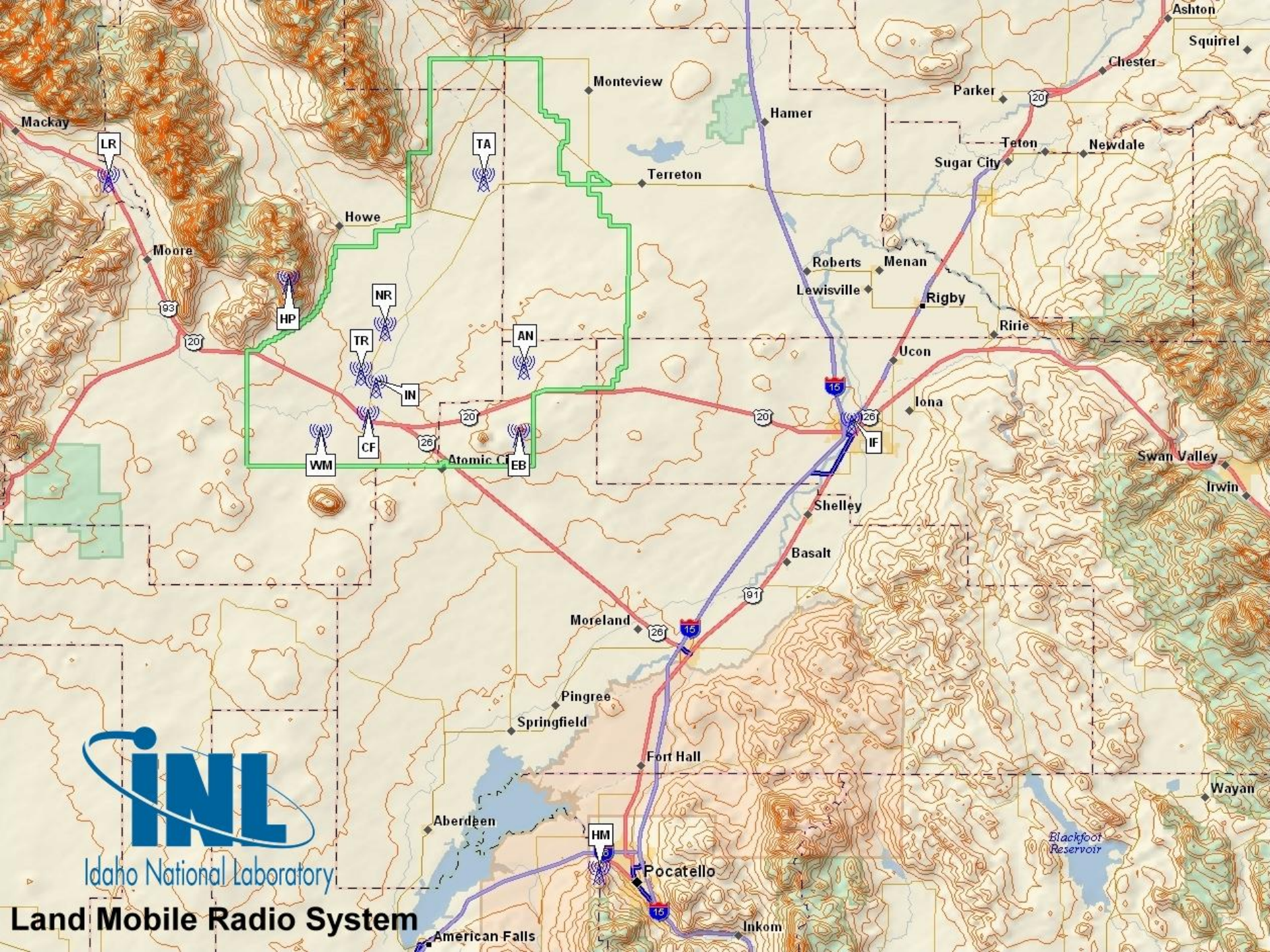
Land Mobile Radio system

- Trident Passport system with Kenwood radios
- Twelve (12) transmission sites, non-simulcast (12.5 kHz) UHF trunking - Interconnected by optical, microwave, T1's and leased telecommunication infrastructure (T1's and DSL)
- Main Sites linked by two (2) 7 GHZ Nera Interlink OC3 2+1 protected microwave paths
- 44 UHF spectrum allocation pairs - 4 simplex channels
- 2015 end-user devices - 1,500 handheld and 515 vehicle/base radios
- 258 Talk Groups - split between 4 different M&O Contractors at 8 different INL campus facilities
- 12 Orbacom T5 consoles – Security (5), Fire Dispatch (2), and Emergency Command Centers (3), Wireless (1), Maintenance (1)

Current Wireless Systems

Land Mobile Radio system

- Exacom Digital Logging Recorder – can record 20 simultaneous talk-groups.
- Third party DES encryption chip – Transcrypt add-on module
- Three (3) separate (independent) command and control communications centers – backup for each other
- 3 Wireless personnel
  - Spectrum Manager/Wireless Engineer
  - Wireless Engineer/Budget/Admin/Sub-contract Rep/TPOC
  - Wireless Technician (subcontractor)
    - Supplemented as-needed with Telephony subcontractor personnel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EB
Swan Valley
Irwin
Shelley
Basalt
Moreland
Pingree
Springfield
Fort Hall
Wayan
Aberdeen
HM
Blackfoot Reservoir
Pocatello
Inkom
American Falls
Idaho National Laboratory
Land Mobile Radio System

Legacy Paging System

- Glenayre Transmitters: 11 sites, simulcast, one-way
  - Uplink: 12.5 kHz UHF and special circuits
  - Downlink: VHF 25 kHz
- Two (2) Zetron 2200 Paging Terminals – Main and Hot Standby
- 4400 pagers in the system – 600 active pagers
  - Users moving toward SMS/Texting
- Plan to Decommission - License expires 2013, Requesting extension
- **Challenges**:
  - Security – Only device allowed in security/controlled area
  - ERO – Wide notification to large group within specified timeframe
- Moving toward SMS/Texting, local pager services, or carrier services
- End-users need to budget for services and equipment

900 MHz, Unlicensed FCC Part 15

GasBoy System

- Avlan 900 MHz radio: 5 access points, 8 subscriber units, 1 server
  Provides real-time data for 8 different location fueling stations

USGS

- Freewave 900 MHz spread-spectrum: 52 radios scattered throughout Southeast Idaho to monitor/report seismic activity

Facility monitoring

- Sen-Source 900 MHz spread-spectrum: 94 sensors located throughout 62 buildings providing facility data to a central server

Miscellaneous

- Barcode readers, data loggers, weather sensors, telemetry, well monitoring, phones, etc.

2.4 GHz Wi-Fi Network

- **Cisco Access Points (a, b, g, n)**
  - 150 access points, providing connectivity throughout major INL buildings
  - Partitioned off
    - Internal INEL-NT network
    - External Visitors net for access to the Internet
  - Password protected
    - External access through VPN and RSA Secure token
  - Administered by Data Network personnel
  - Bluetooth applications, Zigbee, phones, SCADA sensors, RFID (testing), ad-hoc stand-alone networks

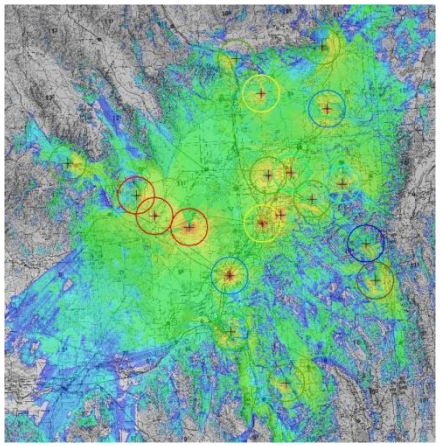
5.8 GHz Wi-Max Broadband

Redline Communications

- AN-80i Radios
  - 13 access points, providing connectivity across the INL site
  - 18 subscriber units, most are mobile, more coming on-line
  - 4 Bridge links, providing backup for microwave paths or replacing expensive T1's
- Fast throughput for remote access, 54 mbps, can be licensed for 108 mbps
- Administered by Data Network personnel, supported by Wireless
- Wireless phones, sensors, etc. more and more devices migrating from 2.4 to 5.8 GHZ

INL Wireless Test Bed

- 1 of 7 DOE sites designated as an NTIA 7.11 Experimental Station
- Customers are primarily DOD, DOE, other Government Agencies
- Internal infrastructure for testing: LMR, GSM, CDMA, UMTS, Wi-Fi, Wi-Max, SCADA, and power grid
- Customer completes a Spectrum Request form
  - Reviewed by the Wireless Test Bed PI
  - Approved by the INL Spectrum Manager
- RF propagation plots are generated using ATDI



- FCC ULS and GMF databases are searched for active licenses
- Any aerial or high power tests are sent to NTIA FAC at Nellis AFB
- Attractive demographic aspects of the area
  - Low population
  - Available spectrum w/out interference
  - Geographic separation
  - Ability to dynamically change tests
  - Highly technical Eng. Staff
  - Low RF noise environment

P25 Land Mobile Radio 800 MHz Project

- Awarded April/May 2011
- Setup as a managed service, presented at last IMC-2011
- Changes the way subscribers approach service, request for services, maintain equipment, and budget planning
- Federal interoperability with State, Tribal, Regional, County, Local Govt.
  - Plan was to move First Responders to new system, 700 MHz
  - Requested 700 MHz allocations from State and local District governance
    - No luck
- Vendor had enough 800 MHz allocations
- Equipment being installed on an accelerated schedule, System-wide exercise with outside agencies scheduled for June 30, 2012
- Phase 1 - move First Responders
- Future - transition utilitarian users

P25 Land Mobile Radio 800 MHz Project

- New way of doing business, requires a change of mindset for everyone
- Even though project is not done, a lot of items to keep aware of

Internally

- Work closely with stakeholders
  - Must have stakeholder buy-in
  - Brief users early and often
- Work closely with Procurement
  - Personnel can change
  - Need continuity through project
- Communicate resource needs to support organizations/crafts
- Set up training plan early
  - Transition takes time
  - Plans have to be written and implemented

Externally

- Clearly defined contract verbiage
  - What you think you read – is not
- Clear demarcations on buildings
  - Try to not use internal infrastructure
  - Defined boundaries/expectations
- Close interfaces/communications
  - Maintain good working relationship
- Timely project status updates
- Commit to schedule, stay on track
- Early outside-agency interaction
  - Continual involvement

Spectrum Management Challenges

- Tracking RF transmitting devices
  - Employees order, items for sale not legal, customer responsibility
  - Procurement brought into the process
  - RF exposure measurements, employees not knowledgeable
  - INL Transmitter database
- Staying current with new technologies, knowing what is out there
- Interfacing new technologies to enable workforce to be:
  - Effective / efficient
  - Mobile / Secure
- Inconsistencies between FCC/NTIA agencies and commercial/federal use

- Requirements
- Applications
- Products
- Priorities
- Policies
- Collaboration

Questions?